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THE COTTAGES OF SWITZERLAND

SWISS COTTAGES.

Thus every good his native wilds impart,
Imprints the patriot passion on his heart;
And e'en those ills that round his mansion rise
Enhance the bliss his scanty fund supplies:
Dear is that shed to which his soul conforms,
And dear that hill which lifts him to the storms;
And as a child, when scaring sounds molest,
Clings close and closer to the mother's breast,
So the loud torrent, and the whirlwind's roar,
But bind him to his native mountains more.—GOLDSMITH.

SWITZERLAND occupies a singular position among European nations. It has no connexion whatever with the ocean, but is hemmed in by three large countries, Germany, France, and Italy. This circumstance has naturally given to its inhabitants and its institutions a certain mixed resemblance to all three of those countries. But this resemblance is less striking than would in most cases be found, on account of the mountain-chains which serve as a barrier between Switzerland and the neighbouring countries. These mountains are more particularly remarkable for their size and extent on the southern side of Switzerland, where they separate it from Italy, and this is precisely the part where the influence of a neighbouring nation has been least felt, for Switzerland and its inhabitants resemble Italy much less than it resembles either Germany or France. But there is a peculiar character about the Swiss, which, in truth, separates them from all three of the countries we have named. This is as observable in their dwellings as in any part of their economy. A Swiss cottage is associated in our minds with a kind of edifice differing a good deal from those of Germany, Italy, or France.

A Swiss cottage in the Canton de Vaud, according to the description of M. Simond, very frequently bears the following character. It is not unusually of the enormous size of eighty or one hundred feet square. It is very low, but has an exceedingly lofty shingle roof, which is loaded with large stones, to prevent it from being blown away with the wind, and projects, in the piazza shape, over an outside gallery, up a flight of stairs. This is properly the ground floor, or rather the snow floor, for the lower floor, ramparted as it is with fire-wood, and buried in snow in winter, becomes a sort of cellar, where the provisions are kept, and where the cows are housed. A large door, in the centre of the building, gives entrance to the various farming carriages and implements, as well as to all the winter fodder: thus the stable, the barn, and the dwelling, are all under the same roof, with all the apparatus of home manufactures, carried on in winter, and their produce, cheese, butter, &c The family have access to all parts of this their domestic world, without ever stepping out of doors. These houses (which a single spark might set in a blaze), as well as all the houses in the Canton de Vaud, are obliged by law to be insured. The accounts are kept by government, free from any contingent charges of administration, and the proprietors of houses pay no premium, but only their respective share of losses by fire. The houses are estimated at three-fourths of

their value only, and the aggregate of losses is equal to about one in a thousand yearly.

The same traveller, being located for a time in another part of Switzerland, gives a description of a cottage apparently rather more humble than the average run of them. It was, however, built of larch, and was spacious and clean. It had a large common room up stairs, with several windows to it. The furniture of the room consisted of a long bench round three sides, and a long table before it: an enormous earthen stove was so placed and constructed as to answer the purpose of steps to ascend to the next story above, by an opening in the ceiling of the room. The kitchen, in another part of the building, had no chimney, but the smoke issued out through a hole in the roof, covered with a shutter that was opened or closed by pulling a rope. Above the first floor, built of stone, the structure was composed of square beams, placed one over the other, and dovetailed at the angles of the building, the whole covered with boards, within and without. Although the sides of the building showed only one story above the ground floor, yet the gable end, or rather front, had four or five, each marked by a row of small contiguous windows. This front was decorated with passages from the Scriptures, inscribed very neatly on the wood. The wood was not painted, but the turpentine, which had long before oozed through its pores, had hardened on the surface to a kind of varnish.

An entertaining English writer, lately deceased, Mr. Inglis, has given a very detailed account of the houses, within and without, in a part of Switzerland called *Engadine:*—

During my day's walk I passed through many large villages, the names of which I do not recollect, but whose size appeared to me very disproportionate to the extent of the valley in which I found them. The great size of the houses, however, partly accounts for this. In no part of Europe have I seen the houses of the natives so large as I found them throughout the whole of the Unter and Ober Engadine.

He then proceeds to state that a village in every part of the Engadine is the same. It consists of one street, long or short, as the case may be, with some few and very short lateral openings, scarcely deserving the name of streets. In some part of the street there is an open space, with a fountain in the centre,—plain, but not ineligant, and closely adjoining the village, but seldom forming a part of it, is the village church,—in size and architecture nearly resembling the country churches in Scotland.

The houses in these villages are of an enormous size: indeed Mr. Inglis affirms that they cover an area greater than that occupied by any two houses in Portland Place. Their height never exceeds two stories, and the roof, which is covered with square pieces of wood, laid on like slates, upon which trunks of fir-trees are placed transversely, falls back at a very acute angle. The exterior of the houses presents a good deal of decoration. Upon the white plaster copies of Greek and Roman designs are painted in lead colour: painted Doric or Corinthian columns adorn the door-posts, and the imitation is so good as to deceive a spectator until he approaches near. The door or gateway is generally arched, and painted with some tasteful design. Sometimes an imitation of a Greek pediment is painted over the windows, and in some instances every part of the exterior is painted with one uniform design, the whole front and sides being set off with pillars, pilasters, pediment, &c.; so as to give at a distance some resemblance to a Grecian temple.

It is difficult (says Mr. Inglis) to understand how this custom and taste have arisen. The painting is for the most part old, and in some places has been renewed, but not with equal skill; and upon the houses recently erected nothing of the kind has been attempted. These, however, are but few, and form a very trifling exception when speaking of the appearance of the Engadine villages. I cannot conceive any other origin of so singular and so universal a practice than that some Grison architect, who had left his native valleys, acquired in Italy a taste for the classic models of that land, and returning to his country, exercised his profession, and, at the same time, fed his recollection of the glorious things he had seen, by adorning the buildings of his native village. The taste might soon spread, and in the six or eight villages of the Ober Engadine a few years only would be required to satisfy its demands. In all that I have yet said, or may still say, respecting the villages and houses of the Engadine, I speak with reference to both the Ober and Unter Engadine, with the exception of the painting upon the walls, which I think is confined to the Ober Engadine; at all events it does not extend to more than one village in the lower valley. Let me add to this description of the exterior of the houses, that upon some part of the wall, generally over the gate, is found an inscription, sometimes in Roman, sometimes in Latin, indicating the period at which the house was built, setting forth the name of the builder, and containing, besides, a recommendation of the house and its inhabitants to the protection of God.

Mr. Inglis then describes the interior of these dwellings. Within the gateway or door is a spacious chamber, with an earthen floor, which serves as a sort of inner court-yard, and which presents a strange contrast to the ornamented gateway. This apartment is used as a general store-house. Ranged on one side are all the utensils required in a dairy, such as churns, cheese-presses, and the innumerable flat wooden dishes, used for the reception of the milk. On another side are various agricultural implements, together with ladders, saws, and other tools. Several spinning-wheels stand in one corner: a quantity of skins are heaped in another: and one end is always devoted to the fuel, and is heaped with wood as high as the roof. From this large store-room are entrances leading to the different apartments, the kitchen, the eating rooms, and other rooms, varying in number according to the size of the house and the necessities of the family. The furniture of these rooms is always abundant, substantial, and sometimes ornamented with carved wood-work. The sleeping-rooms are almost always above stairs, but scarcely correspond in convenience with the lower part of the house.

Swiss houses appear to have been built of wood for many ages past: probably the majority of them have never been formed of any other material. Coxe, writing sixty years ago, respecting the canton of Appenzel, says:—

In our way to Appenzel we entered several houses which were all built of wood, neatness and convenience being the principal object of the owners: such a remarkable cleanliness prevailed throughout as afforded a most striking proof of the general attention which people pay to that essential article. A continued chain of these cultivated mountains, richly clothed with wood, and thickly studded with hamlets, exhibit a series of landscapes inexpressibly pleasing.

In another passage, speaking of Aargau, he says:—

The houses, like those of Appenzel and Glarus, are generally of wood, and it was a natural observation of one of our servants, in passing through a continued chain of rocks, that as there was no deficiency of stone, it seemed extraordinary to employ wood alone for the purposes of building. But it may be remarked that these wooden houses are soon constructed and easily repaired, and being formed in a compact manner, with small rooms, and low ceilings, are sufficiently warm even for so cold a climate. The chief objection arises from the danger of fire, which, however, is in some measure obviated by the method of building their cottages detached from each other. But this observation does not hold with respect to some of the largest burghs, which are exposed to the ravages of this dreadful calamity.

Of course the dwellings in Switzerland vary with the place where they are built, and with the means of those to whom they belong; but the cut at the head of this article may be considered as a general representative of the houses in the romantic valleys of that country.

MEMOIR OF THE LATE Dr. THOMAS YOUNG.

In 1831, a memoir of Dr. Thomas Young, one of the most distinguished men of the age, was printed solely for private distribution, and with the hope, modestly expressed on the part of the writer, that the "imperfect sketch" then produced would afterwards be filled up by "some abler hand."

With the exception of the short but masterly sketch given by the celebrated M. Arago, in the *Revue des Deux Mondes*, this hope has not been yet fulfilled; but as the name of Young, and the fame of his extraordinary attainments, may have reached many of our readers, and excited a desire for further information respecting this highly gifted individual, we proceed to lay before them such details as may be conveniently gathered from the sources above alluded to.

Thomas Young was born at Milverton, in Somersetshire, on the 13th of June, 1773. His parents were Quakers, and of the strictest of that sect: his mother was a niece of Dr. Richard Brocklesby, a physician of eminence, who was connected with some of the most distinguished literary and political characters of his time, and who numbered among his most intimate friends Johnson, Burke, and Windham. To the influence of the early impressions of the Quaker tenets Dr. Young "was accustomed to attribute in some degree the power he so eminently possessed of an imperturbable resolution to effect any object on which he was engaged, which he brought to bear on everything he undertook, and by which he was enabled to work out his own education almost from infancy, with little comparative assistance or direction from others." He passed the first years of his life at the house of his maternal grandfather, Mr. Robert Davies, of Minehead, whom active commercial engagements had not prevented from cultivating the classics.

Young appears to have been a forward, if not a precocious child; but unlike the majority of such children, he abundantly fulfilled the expectations of his friends, so that his after course more than corresponded with the promise of his youth. At the age of *two years* he could read fluently, and showed signs of an extraordinary memory. Very soon after this, in the intervals of his attendance at a village school at Minehead, he committed to memory a number of English verses, and by the time he was four years old he had learned by heart a variety of English authors, and even different Latin poems, which he could recite from beginning to end, though unacquainted with the language. Before he was six years old he was sent to a school kept by a dissenting minister at Bristol. Here the mediocrity of his master proved no barrier to his progress, for he became essentially his own instructor, and had generally studied the last pages of his books before he had reached the middle under the eye of the teacher.

When he was eight years old he attracted the attention of a land-surveyor of merit, residing near his father's house, and was allowed to spend as much time as he liked during the holydays, in the office of that gentleman, where he was indulged with the use of mathematical and philosophical instruments, and the perusal of three volumes of a *Dictionary of Arts and Sciences*. These were to him sources of instruction and delight, of which he never seemed to be weary. At this time he acquired some knowledge of land-surveying, and amused himself in his walks by measuring heights with a quadrant.

From the age of nine to his fourteenth year Young lived with a Mr. Thomson, at Compton, in Dorsetshire, where he was occupied, in common with the other boarders, with a close attention to Greek and Latin. He was always at the head of his class, and yet at the same time he made some progress in French, Italian, Hebrew, Persian, and Arabic. The French and Italian he learned in order to satisfy the curiosity of a companion, who had in his possession several works printed at Paris, of which he wished to know the contents; the Hebrew to read the Bible in the original; the Persian and Arabic with a view of deciding this question, raised during a conversation at dinner,—"Are the differences between the Oriental languages as marked as between those of Europe?" Without the certainty that we gather our information from authentic sources we should hesitate to add, that at the time when he was making this extraordinary progress in languages, he entered so ardently on the study of botany that in order to examine plants he set about the construction of a microscope, without any other guide than the descriptions given by Benjamin Martin. In order to succeed in his difficult task he found it necessary to acquire much dexterity in the art of turning, and falling upon a demonstration in Martin's *Philosophy*, which exhibited some fluxional symbols, he was not satisfied until he had read and mastered a short introduction to the doctrine of fluxions.

Such incessant activity had the effect which might have been expected, and at fourteen years the health of Young was greatly changed. He was attacked by symptoms of what his friends feared to be incipient consumption,—symptoms which happily yielded, after a time, to the prescriptions of art and the extreme care of his parents. During his indisposition he merely relieved his attention by what to him stood in the place of repose—a course of Greek reading in such authors as amused the weariness of his confinement. In the year 1787 he became the fellow-pupil of the grandson of Mr. David Barclay, of Youngsbury, in Hertforshire, it having been agreed that the two youths should pursue their studies together, under a private tutor, at Mr. Barclay's house. As a proof of his proficiency at this period we may give the following anecdote. On the day of his arrival at Youngsbury Mr. Barclay gave him some sentences to copy, to ascertain if he wrote a good hand. Young, perhaps a little humbled at such a proof being required, asked permission to retire into an adjoining room. He remained longer than appeared necessary, and Mr. Barclay began to joke about the young quaker's want of dexterity; but he presently returned with a remarkably beautiful copy, and a translation of the sentences into nine different languages.

According to the Memoir we principally follow, the tutor did not arrive, and Young took it on himself not only to direct the studies of his companion, but of another student, who now joined them, Mr. Hodgkin, author of the *Calligraphia Græca*. But M. Arago gives us a different account. He says, the preceptor who directed the studies of the two young scholars at Youngsbury was a distinguished young man, then engaged in perfecting himself in a knowledge of the ancient languages, and was afterwards the author of the *Calligraphia Græca*. He was not long, however, in perceiving the superiority of one of the two pupils, and observed with the most laudable modesty, that in their common studies, the true *tutor* was not always he who bore the title.

Thus passed the five years from 1787 to 1792, the summers being spent in Hertfordshire, and the winters in London. The little party of students had the advantage of occasional masters, during their annual visits to the metropolis, and with this aid Young made himself surprisingly familiar with the great writers of antiquity, keeping ample notes of his studies. He had now acquired facility in writing Latin, composed Greek verses, which were well received by the distinguished scholars of the day, and applied himself assiduously to the higher mathematics. To the studies of botany, zoology, and especially entomology, he at the same time paid considerable attention. He drew up from original sources a detailed analysis of the numerous systems of philosophy

which were professed in the different schools of Greece. The train of thought excited by the study of the conflicting opinions of the ancients is supposed to have mitigated in some degree Young's attachment to the views of his own sect, the quakers, from whose society he subsequently separated himself, during his residence in Edinburgh. In the course of his visits to London he attended the chemical lectures of Dr. Higgins, and having previously prepared himself by reading on the subject, he began to make simple experiments of his own. But he was never fond of repeating experiments, nor even of originating new ones, considering that, however necessary to the advancement of science, they demanded a great sacrifice of time, and that when the fact was once established, that time was better employed in considering the purposes to which it might be applied, or the principles which it might tend to elucidate.

Dr. Brocklesby, the maternal uncle of Young, being justly proud of the success of the young scholar, communicated some of his compositions to philosophers and literary men, and thus introduced him to the notice of Burke, Windham, and other celebrated characters. By means of their patronage, Young might easily have secured some lucrative post under government, but he preferred the independent though laborious career of a literary life. By the advice of his uncle, he directed his views to the studies necessary for the practice of physic. These studies were commenced in London under Baillie and Cruickshank, and continued at Edinburgh, where Doctors Black, Baillie, and Munro, were then highly distinguished. Young took his degree at Göttingen in 1795.

The biographer of Young justly remarks that his self-conducted education in privacy, was not without its disadvantages: that though the acquirements he made during those five years of seclusion were great, he was not gaining that which is acquired insensibly in the conflict of equals in the commerce of the world,—the facility of communicating knowledge in the form that shall be most immediately comprehended by others, and the tact in putting it forth that shall render its value immediately appreciated.

Before taking his degree, Young had become known to the scientific world by a controversy which he had carried on with Dr. Beddoes on Crawford's Theory of Heat;—by a Memoir concerning the habits of spiders; and by an observation relating to Gum *Labdanum*. He also communicated to the Royal Society his Observations on Vision, and his Theory of the Muscularity of the Crystalline lens of the Eye, which became the subject of much discussion, John Hunter laying claim to having previously made the discovery. He was soon after elected a fellow of the Royal Society.

In the intervals of more serious pursuits he found leisure for cultivating those arts in which his early education had left him deficient. Everything was with him a science, and whatever he followed he followed scientifically. He cultivated skill in bodily exercises, took lessons in horsemanship, in which he always had great pleasure, and practised under various masters, all sorts of feats of personal agility. The first time he mounted a horse, the riding-master who accompaned him leaped over an elevated barrier; Young wished to follow him, but was thrown over the horse's head ten feet. He got up without saying a word—made a second trial—was again dismounted, but did not pass this time over the head of the animal. On the third trial the young student succeeded in accomplishing what had been done before him. Both at Edinburgh, and at Göttingen he carried these kinds of exercises much farther than might have been expected. He even vied successfully with a distinguished rope-dancer, and acquired extraordinary facility in the art of vaulting on a horse. Thus we find a striking contrast between Newton, riding in a carriage with his arms extended and grasping the coach doors, from the fear of falling; and his illustrious competitor, who would gallop erect upon two horses, with all the assurance of a riding-master.

While at Göttingen, he excited the wonder of his fellow-students by his attainments and almost incredible industry. He had acquired at an early period a profound knowledge of the theory of music. His taste for painting was confirmed during his residence in Germany There his attention was entirely taken up with the collection at Dresden. He studied the defects and peculiarities of the greatest matters, their frequent changes of style, the material objects of their work, and the modifi fications which the objects and colours underwent in the lapse of time. He is said to have studied painting in Saxony in the same manner as he had studied the languages in his own country, and as latterly he cultivated the sciences. In fact, everything in the sight of Young appeared worthy of meditation and research. His college acquaintances relate that having entered his room during the day that he had received his first lesson in dancing a minuet, they found him busy, with a rule and compass, measuring the intersecting directions which the two dancers followed, and the different improvements which the various figures appeared susceptible of acquiring.

During his residence in Germany he composed a treatise entitled *De Corporis Humani Viribus Conservatricibus*, leaving few volumes unconsulted which had any connexion with his subject. He also gained a very general and accurate acquaintance with the language and literature of Germany, which he kept up throughout his life; he remarked that he found in Germany a love of new inventions, singularly and somewhat pedantically combined with the habit of systematizing old ones. and of giving an importance to things in themselves trifling, which in his case rather confirmed an original habit of dwelling on minutiæ more than his subsequent experience led him to think was advantageous.

THE Russian is scarcely ever seen to strike the animal over which he has power—his horse is seldom propelled by any other influence than a few cheering and encouraging sounds, and if this increases not his pace, he does not, heated with savage fury, dissect the savage beast with a scourge, beat out an eye, or tear out his tongue. The Russian proverb is, "It is not the horse, but the oats, that carry you." As long as the horse will eat, he feeds him; and his appearance generally honours the humanity of his master.

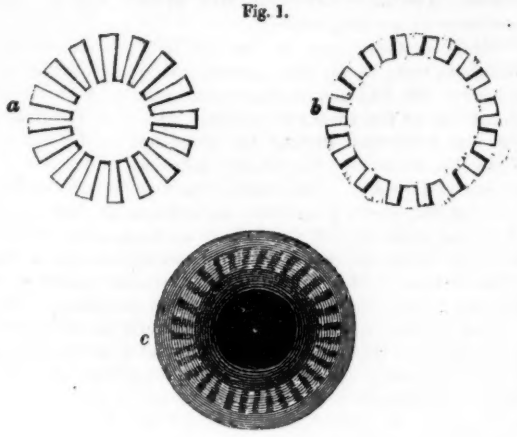
PERDIDI DIEM.

"I HAVE lost a day," said Titus, "for this day
To none have I done good." Oh! rather say,
The day this noble sentiment had birth
Shines out transcendent with enduring worth.
Small the *material* good thou could'st achieve,—
Transient and limited; but Time shall leave
These words a living lesson, potent still
To sway tow'rds generous deeds the human will,
When he hath stript of power Imperial Rome,
And crumbled into dust her proudest dome.—H. W.

THE results of deep research or extravagant speculation seldom provoke hostility, when meekly announced as the deductions of reason, or the convictions of conscience. As the dreams of a recluse or an enthusiast, they may excite pity or call forth contempt; but, like seeds quietly cast into the earth, they will rot and germinate according to the vitality with which they are endowed. But, if new and startling opinions are thrown in the face of the community—if they are uttered in triumph or in insult—in contempt of public opinion, or in derision of cherished errors they lose the comeliness of truth in the rancour of their propagation; and they are like the seed scattered in a hurricane, which only irritates and blinds the husbandman.—SIR DAVID BREWSTER

OPTICAL ILLUSIONS. VI.

Fig. 1.



In our last paper on this subject we described several remarkable experiments made by Dr. Faraday, as well as the apparatus which he contrived for conducting them. We now proceed to speak of other experiments, made by the same gentleman.

It will be remembered that in the experiment described at the end of the last paper, two wheels having an equal number of teeth or cogs, but one having the teeth deeper than the other, gave, when viewed in the revolving apparatus, a spectral wheel with double the number of teeth. This is shown by the annexed figure, (fig. 1,) in which *a* is the wheel nearest to the eye, and having the deepest teeth, *b* the other wheel, having, like the other, sixteen teeth, and *c* the spectral wheel, with thirty-two teeth. It would be tedious to follow out the cause of each variety of effect produced in this experiment, but it may suffice generally to say, that they all result from the occurrence of one set of impressions on the retina before a previous set of impressions has lost its influence.

Dr. Faraday describes a very simple experiment, to show the production of a spectral line, where none such exists in the original objects. If a little rod of white cardboard, five or six inches long, and one thirtieth of an inch wide, be moved to and fro, from right to left, before the eye, an obscure or black ground being beyond, it will appear to spread a tint over the space through which it moves, as in fig. 2, *a*. A similar rod held and

Fig. 2

moved in the other hand will produce the same effect, but if there be visually superposed, *i. e.*, if one be moved to and fro behind the other, also moving, then in the quadrangular space included within the intersection of the two tints will be seen a black line, sometimes straight, and connecting the opposite angles of the quadrangle, as in fig. 2, *b*, at other times oval or round, or even square, according to the motions given to the two cardboard rods. This appearance is visible even when the rods are several inches or a foot apart, provided they are visually superposed. By carefully examining the effects produced, and tracing them to their causes, it will be seen that the black line is the path of the intersecting point of the moving rods. As their motions vary, so does the course of this point change, and wherever it occurs there is less eclipse of the black ground beyond than in the other parts, and consequently less light from that spot to the eye than from the other portions of the compound spectrum produced by the moving rods.

In the experiment just described the eye should be fixed, and the part observed should be between the planes in which the rods are moved. Those who find it difficult to observe the effect at first will instantly be able to do so if the rod nearest the eye be black, or held so as to throw a deep shade: the line is then much more distant. Two bright pins or needles produce the effect very well in diffuse day-light, and the line produced by the shadow of one on the other and that belonging to the intersection are easily distinguished and separated. If, while a single bar is moved in one hand, several bars or a grating is moved in the other, then spectral lines, equal to the number of bars in the grating, are produced. If one grating is moved before another, then the lines are proportionably numerous; or, if the distances are equal, and the velocity the same, so that many spectral lines may coincide in one, that one is so much the more strongly marked. If the bars used be serpentine or curved, the lines produced may be either straight or curved at pleasure, according as the positions and motions are arranged, so as to make the intersecting point travel, in a straight, or a curved, or in any other line.

Dr. Faraday shows that the production of a line in this experiment, where none exists in the original objects, depends on the same cause as the production of a spectral wheel, with twice as many teeth as either of the real wheels, in the experiments with the revolving machine; and to show more clearly the nature of this effect he varied the experiments in several different ways.

1. When wheels were used, having equal but oblique teeth, and the obliquity in the same direction, the spectrum was also marked obliquely, but when the obliquity was in opposite directions the spectrum was marked as with straight teeth.

2. When equal wheels were revolved with opposite motions, one rather faster than the other, the spectrum travelled slowly in the direction of the fastest wheel: when the difference in the velocity of the two wheels was made greater the spectrum travelled faster.

3. When one wheel contained more cogs than the other, as, for instance, twenty-four and twenty-two, then with equal motions the spectrum was clear and distinct, but travelled in the direction of the wheel having the greatest number of teeth. When the other wheel was made to move so much faster as to bring an equal number of cogs before the eye, in the same time as the other, the spectrum became stationary again.

4. When the motion of the wheels upon the machine is in the same direction, the velocities equal, and the eye placed in the prolongation of the axis of the wheels, no particular effect takes place. If it so happens that the cogs of one coincide with those of the other, the uniform tint belonging to one wheel only is produced. If they project by the side of each other, it is as if the cogs were larger, and the tint is therefore stronger. But when the velocities vary, the appearances are very curious: the spectrum then becomes altogether alternately light and dark, and the alternations succeed each other more rapidly as the velocities differ more from each other.

5. When wheels with radii, instead of cogs or teeth, are put upon the machine, the carriage-wheel phenomenon is observed with great perfection. They should be viewed obliquely, so as to be visually superposed only in part: and provided the wheels are alike, and both revolving in the same direction with equal velocity, they immediately assume the curved form described in the last paper.

6. If the wheels revolve in opposite directions, then

the spectral lines, originating at each axis as a pole, have another disposition.

7. The carriage-wheel experiment may be further imitated, by mounting the revolving machine with a single wheel carrying several equal radii at equal distances, and holding a small grating between the wheel and the eye. The bars of the grating should be equidistant, the intervals between them being about equal to that between the extremities of two contiguous spokes of the wheel.

As a variation in the mode of observing many of these phenomena Dr. Faraday recommends the following: to cast the shadows of the revolving wheels, either by sun or by candle-light, upon a screen, and observe their appearance. The way in which the cogs or radii of the wheels shut out more or less of a back-ground from the eye will enable them, to an equal degree, to intercept light which would otherwise fall upon a screen. When the two equal cog-wheels are revolved, so as to have the shadows cast upon a white screen, that shadow exhibits all the appearances and variations observed when the eye is looking by the wheels in shade at a white back-ground. The shadow is light where the wheels appear dark, for there the light has passed by the cogs,—and dark where the wheels appear light, for there the cogs have intercepted most of the rays. The screen should be near to the wheels, that the shadow may be sharp, and it is convenient to have one wheel of rather smaller radius than the other, or else to place them obliquely to the sun, for the purpose of distinguishing the shadow of each wheel, and showing how beautifully the spectrum breaks out where they superpose. When the spoke-wheels are revolved they also cast a shadow, presenting either the appearance of fixed or moving radii, according to the circumstances already alluded to.

The same ingenious philosopher also shows that *reflection* will produce a similar train of beautiful effects. If a white cardboard wheel, with equal radii, be fixed upon a pin, and rotated between the fingers before a glass, so that the wheel and its reflected image may visually superpose in part, the fixed hues will be seen passing in curves between the axis of the wheel and the reflected image. If the person gradually recede from the glass, but still look through the wheel in his hand at the reflected image, *i. e.*, still retain them superposed, which is best done by bringing the revolving wheel close to the eye, he will see the lines or radii of the reflected image gradually become straight, and when from three feet to any greater distance from the glass, will see the spectrum of the reflected image, having as many dark radii upon it as there are radii in the wheel he is revolving. Whatever the velocity, or however irregular the motion of the wheel, these lines are perfectly stationary. A very striking deception may be obtained in this way, by revolving a single cog-wheel between the fingers before the glass, when from twelve to eighteen feet from it. It is easy to revolve the wheel before the face, so that the eyes may see the glass through or between the cogs, and then the reflected image appears as if it were the image of a cog-wheel, having the same number of cogs, but perfectly still, and every cog distinct, instead of being the image of one in such rapid motion that by direct vision the cogs cannot be distinguished from each other, or their existence ascertained. The effect is very striking at night if a candle be placed just before the face, and near to it, but shaded by the wheel: in the reflection the wheel is then well illuminated, and the reflected face or shadow forms a good back-ground against which to observe the effect. When we come to speak of M. Plateau's experiments it will be seen that this gentleman made much use of a mirror apparatus for such experiments as these.

Another experiment, beautiful from its very simplicity, was described by Dr. Faraday. A disk of cardboard, about two inches and a half in diameter, was cut into a wheel like fig. 3: another disk, rather larger, was cut into a similar wheel, and then the radii of one were twisted obliquely like thewings of a ventilator, and the radii of the other similarly twisted, but in the opposite direction. A small hole being made in the centre of each, a large pin was passed through that of the smaller wheel, and then a small piece of cork passed on to the pin, to hold the wheel near the head, but free to turn. Two or three beads were then added, the second wheel put on, and then a second piece of cork. The end of the pin was then stuck into a quill or a pencil, and thus was formed an apparatus very like a child's windmill, except that it had two sets of vanes, revolving in opposite directions. On walking across a room towards a window or a candle, with this little toy in the hand, or blowing at it slightly from the mouth, the lines were beautifully seen, being either stationary or moving, according to the relative velocity of the two wheels. This could be altered at pleasure by inclining the vanes more or less, or by blowing towards the centre of the wheels, or towards the edges, when the larger hind wheel received more propulsive force.

Fig. 3.

The more the truths of science are studied, the more evident does it appear that those truths may often be illustrated and experimented on by very simple and cheap apparatus; and these experiments by Dr. Faraday, on the curious and often pleasing illusion under which the evidence of the eye is placed, exemplify this in a prominent manner. We shall shortly resume the subject, by detailing the results of experiments made by other ingenious philosophers.

BUFFALO DANCE OF THE AMERICAN INDIANS.

WE observed, coming from the village, a group of Indians, fantastically dressed in buffalo skins, so as to bear a strong resemblance to that beast. They retained the head, beard, and legs of the animal entire, and were so well disguised that several of them, at a little distance, might have been mistaken for the brute itself. They had prepared themselves to give us the buffalo dance. They drew up in a large circle, at a little distance from a skin tent which had been lent to us by them, our own marquee having become much tattered in a heavy gale a few nights previous. The leader of this band was the Big Kaw, who frisked behind the grave head and beard of an enormous buffalo bull. In the centre of the circle were seated a number of buffaloes, whose business it was to sing, while the rest, consisting of chiefs, squaws, and pappooses, or in other words, of bulls, cows, and calves, danced to their music. The chorus commenced with a low, monrnful ditty, which set the whole herd of dancers in motion. They began by moving slowly round the singers, but as the chant grew more and more animated the vivacity of the herd increased. From a walk they quickened their pace to a trot; from a trot it ambled off into a full gallop. Now the spirit of the beast began to show out. The cows bellowed; the bulls frisked, roared, and fought; they kicked up, they tore up the ground, and chased each other round the circle. This lasted some time, until they grew uproarious, and the butting of horns was furious. At this sight the cows drew off, and several calves, after bursting out into a loud bawl, raised up from all fours, and mounting upon their two hind feet, started off for the village—too much frightened to take any further share in the day's diversions. The dance lasted for about two hours after which the Big Kaw, under the form of a seven-year, old bull, came and seated himself upon a billet of wood, at our sides. He appeared perfectly satisfied with his performance, but was grievously out of wind.

After this followed several other dances of a similar character. They received their appellations from different animals, and the merit of a dance consisted in imitating, as nearly as possible the actions of the beast from which it received its name. They continued until late in the afternoon, when the Indians, one after another, departed to their homes; and long before nine o'clock the busy hum was entirely stilled, and a deep silence hung over our tent, and the surrounding prairie.—*Indian Sketches.*

CHINA. XIII.

ISLAND OF CHUSAN.—APPEARANCE OF THE COUNTRY.—RESPECT FOR THE DEAD.—JOS-HOUSES.—BUDHISTS.—MANDARINS.

WE recently presented our readers with some account of Tinghai, or Tinghai-een, a city in the island of Chusan, for which we were indebted to the interesting narrative of Lord Jocelyn: we again avail ourselves of the information he has furnished of what he witnessed in other parts of the island.

A native compradore, (purveyor,) who had been of essential use to our troops in procuring supplies of cattle, and in assisting as an interpreter in default of a better, was, while foraging, seized by mandarin soldiers, and carried away pig-fashion, upon a pole. Two or three small parties were ordered to traverse the island in pursuit of him, one of which was accompanied by our author. He thus describes the scenery of the interior:—

The road, or rather path, was flagged with large square blocks of stone, of sufficient breadth to allow three persons to walk abreast. Through this town, and indeed over the whole island, the roads were of the same description; and from what we have since seen of the tracts of the main land, they appear all on the same model, and of the same breadth. After traversing for some miles a luxuriant sea of paddy-fields, the way wound up the side of the mountains, through a lonely pass: the path here was cut into easy flights of steps, and these passages, which were numerous through the whole island, were all formed in the same manner. The surrounding hills were covered with the tea-plant, cotton, dwarf-oak, and a species of arbutus, rich with its red fruit; whilst their lofty summits towered on high, clad in the bright green pasture. The long valleys seen from the ascent stretched from the mouths of the different ravines, some lost in the many windings in the hills, whilst others again swept down to the sea-shore, laden with their luxuriant crops of rice, bending to the morning breeze; and far away over the curious buildings of Tinghai, the British fleet lay anchored on the sleeping water. Here and there, as if dropped at random upon the sides of the hills, were clumps of fine trees; and, peeping through their thick foliage, the roofs of houses and temples diversified the scene. Amongst many of the beautiful groves of trees which here invite the wanderer to repose, spots are selected as the resting-places of mortality: and gazing on these tranquil scenes, where the sweet clematis and fragrant flowers help to decorate the last home of man, the most careless eye cannot fail to mark the beauties of the grave.

It is still a matter of doubt whether the Chinese do not carry their veneration of the dead to the point of adoration; and some centuries ago, the Jesuits, the first missionary labourers in this country, finding it impossible to freeze up the warm affections felt upon this point, turned them into their own channel by inculcating the prayers for the dead upon their proselytes.

The natives of this island do not inter their dead as in the southern provinces; but the corpse is placed upon the ground in a wooden coffin, covered with a lid, easily removed, highly polished, round which the wild flowers and creepers blossom. In most of the houses we entered on the island, these large boxes were the first article that met the eye in the entrance chamber. In the tenanted graves which curiosity induced us to open, the body appeared dressed as in life, the pipe and tobacco lay on the breast, and leaves and rice at the unconscious head.

While the men stopped to breakfast in a temple, we walked on to some of the neighbouring houses. They were all deserted except one, which appeared to belong to the head man of the district; it was buried in a grove of palm and citron trees, and other shrubs unknown to us, and surrounded by a garden where the Cape jessamine and other sweet flowers perfumed the neighbourhood. The building was a good specimen of their country dwellings: on entering through a large wooden gateway we found a yard or court, surrounded on two sides by different out-houses serving as granaries and places to dry fruit, whilst the remaining sides were the apartments of the family and the Hall of Ancestors, a room used in common by all the members of the household. The reason of the large size of these farm-houses is obvious, when it is taken into consideration that they generally contain a father, mother, sons, their wives and children. The front of the Hall of Ancestors was prettily trellised over, and rested on pillars, dry-rubbed and carved; the interior of this large room was surrounded by matted sofas; and little tables stood in the centre, on which were placed the tea-cups and pipes. Under the projecting roof was seated a venerable man, with a long white beard betokening him to be a grandfather, for they never permit its growth until that period. The rest appeared to have fled; and he looked so lonely and desolate, with the tears streaming down his withered face, that, although we were convinced that the compradore had been taken in the neighbourhood of the village, we could not find it in our hearts to capture this patriarch, although he proved to be the elder of the district, and acknowledged having heard the people carrying off the man the previous morning. The heat was intense, and as the men kept continually falling out from its effects, we determined to surround a village and procure coolies to carry the packs and to act as guides.

Having seized a sufficient number for our purpose, we held a parley with a small party that had taken up a position in a neighbouring temple, telling them that our intentions were amicable, and that we required the services of the men we had taken, but would repay them for their labour. During the conversation two little children stole out of one of the houses, and although they were at first terrified by the strangers, I succeeded in tempting one, a very pretty child, to play with a gay cap I wore on my head. A few quarter-dollars soon made us good friends; and the people, seeing we were not the bloody-minded barbarians they expected, became as troublesome from their curiosity and familiarity as they had formerly been coy. No part of our dress was left untouched, and our hands were examined, by which they appeared to judge of our situations in life.

Our halting-places were generally in the temples, and the village supplied us with provisions. The Chinese, as far as these jos-houses are concerned, show very little respect for their religion. Amongst themselves they put them to the same purpose as we did for our troops, and mandarins and travellers of all descriptions use them as caravansaries on their journeys; the mandarins, indeed, if their rank is superior to the jos's as a god, place the latter outside the building during their sojourn.

On the third evening we reached a small town buried in a thick wood, the entrance to which was over a curious bridge, formed, like most of those in Tinghai, of three blocks of stone, or rather slabs, the centre piece lying parallel to the water, whilst the one on each side slants upwards from the bank, resting at one end on the land, and at the other dovetailed into the centre stone. These are often seen fourteen feet long by four or five in breadth; how they manage to place them in the position seems extraordinary, as no machinery for the purpose has been found, and they say it is done merely by manual labour.

The party failed in their endeavours to recover the man of whom they were in search, but took some of the principal inhabitants prisoners, to be held as hostages for his safety. The men had suffered severely from ague and dysentery in their march, but arriving at a sea-port found a steamer to take them back to Tinghai.

In the passage we passed by Poutoo, a small island within musket-shot of Chusan: this is a curious spot, not only from its natural beauties, which are very great

and thought by those who had been at Canton to resemble it, with its rocky stairs, winding along the sides of the hills, clothed with citron and other trees, but also on account of its being the Mecca of the Chinese religion, to which the worshippers of Budh make frequent pilgrimages, somewhat in the style of the Mussulman Hadji. It possesses a large temple, or rather a number of temples, buried in the rocks and jungle; more curious and picturesque, however, from their situation, than from any great magnificence in the structure. Attached to it is a monastery, containing some fifty priests, who seemed proud of their possession, and anxious that visitors should admire it. The old father of this monastery was upwards of eighty years of age: they all complained of a great scarcity of food, as their livelihood consists in the offerings to the gods presented by the worshippers to the temple; and these, during the late troubles, had been differently employed. It was agreed at the time that something should be done to endeavour to minister to their relief, but some weeks afterwards, other parties of military visiting the same place, found that starvation had driven many from their hold, and the poor father was fast travelling to his long home from the want of the necessaries of life.

Our author sailed with the expedition to the mouth of the Peiho, and here landed with Captain Elliot, who had been invited to an interview with the commissioner, Kea'shen. Two miles from the town they were met, agreeably to the etiquette towards visitors of rank, by a mandarin junk, on board of which were two officers, one with the red button in his cap, who was the general of the emperor's Tartar body-guard, and the other, a blue-button mandarin, holding some rank in Kea'shen's household.

They entered our boat, says our author, and handed round their agate snuff bottles, and soon became quite familiar. Blue-button was particularly communicative, asking our names and different professions, and informing us of his own military deeds; and in a private communication he acknowledged that in "the secret chamber" he sometimes indulged in the opium pipe. Red-button, however, who seemed of a more morose disposition, frequently called him to order, as if he feared some disclosures from his talkative propensities.

At the landing-place a bridge of boats had been constructed for our use across the mud-flat; and a narrow pathway, leading some hundred yards from the shore, brought us to an encampment, which had been thrown up for the reception of the mission.

A blue screen was placed at the entrance, so as to hide the interior from the gaze of the public; and here we were met by many more mandarins, and marshalled into the presence of Kea'shen; he rose at our entrance, and received the mission with great courtesy and civility. Indeed, the manners of these high mandarins would have done honour to any courtier in the most polished court in Europe. He begged us to remain covered, and was introduced to each person separately, and expressed his hopes that the supplies had been received by the squadron. He made some excuse for our reception in the tents, but intimated that Tarkou was some distance from the landing place. Judging from appearance, he might have been a man of forty, and looked, what he is said to be by his countrymen, a person of great ability: his tail, the Chinese appendage to men of all ranks, except priests, was remarkable for its length and the care that was evidently bestowed upon it. He was dressed in a blue silk robe, with a worked girdle: on his legs were the white satin boots common to all the higher orders: his head was covered with a mandarin summer cap, made of fine straw: in it was placed the deep red coral button, denoting the rank of the wearer, and the peacock's feather, drooping between the shoulders. On the whole, his dress was plain, but the mandarins when in full costume, judging from specimens taken at Chusan, must have a very gorgeous appearance.

The encampment was surrounded by a high canvass wall, resembling that which encircles the private apartments of great men and native rajahs, when travelling in India. Inside this screen were eight small tents, in each of which a table and forms were placed. These formed an oval, and in the centre was erected a canvass cottage, of rather an ingenious description, whilst at the upper end, concealed by another screen, stood the tent of conference. This was lined with yellow silk (the royal colour) and worked with the arms of the empire at the back.

The interpreters and Captain Elliot remained with the commission, whilst the rest of the officers and gentlemen sought the tents around, in which the lower order of mandarins were busy preparing a breakfast for the party; for it was an extraordinary thing in this visit, that everything was apparently done by mandarins—none of their servants being admitted.

The meal consisted of numerous little plates, piled one upon the top of the other, containing birds'-nest soups, sea-slugs, sharks' fins, hard-boiled eggs, whose interiors were far advanced to chickenhood, and dressed fish: these were the greatest delicacies. This is but a small portion of the supply, for at the table where I had the honour to partake of the *good fare* there were no less than thirty of these little saucers. These breakfasts were spread in the different tents, and each was intended to stay the ravenous appetites of five barbarians.

Some time afterwards, when the expedition had sailed further south, some mandarins came off to the ship and breakfasted with the admiral. It was surprising to see the enormous quantity of food they devoured; and one who was of an immense size, weighing upwards of thirty stone, upon being questioned as to his powers of consumption, acknowledged, with a degree of vanity, that a sheep was his ordinary allowance for three days, nor did he seem at all satisfied with his morning meal. The Chinese, like the natives of India esteem size and bulk, as they imagine such an exterior a sign of wealth and power, and respect it accordingly.

We were much struck at the immense bodily strength and power of the northern Chinese, particularly of the men who were employed tracking the boats upon the river, who, although seemingly a wretched class, more like beasts of burden than human beings, are possessed of such physical powers that six or eight of them will drag against the stream, and with apparent ease, a boat of considerable tonnage.

A full account of those singular people, the Chinese boat-trackers, has already been given in our sixth article on the *Manners and Customs of the Chinese*, Vol. X., p. 82.

A friend of mine, while shooting wild-fowl with his brother, was attended by a sagacious Newfoundland dog: in getting near some reeds by the side of a river, they threw down their hats, and crept to the side of the water, where they fired. They soon afterwards sent the dog for their hats, one of which was smaller than the other. After several attempts to bring them both together in his mouth, the dog at last placed the smaller hat in the larger one, pressed it down with his foot, and then brought them both together. This fact need not be doubted. These individuals have both at different times assured me of its truth. I know an instance somewhat similar. A spaniel was endeavouring to bring a dead hare to his master. After several ineffectual efforts to carry it in his mouth, or to drag it along, he contrived to get all the feet of the hare in his mouth, and in this way conveyed it to his master.—Jesse.

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